IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Zhang et al.

Application No.: 09/894,113

Filed: June 27, 2001

Title: METHODS AND APPARATUS FOR
PERFORMING EFFICIENT INVERSE
TRANSFORM OPERATIONS

Attorney Docket No.: CISCP214/3394

Examiner: Philippe, Gims S.

Group: 2621

Confirmation No. 6264

PRE-APPEAL BRIEF REQUEST FOR REVIEW

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a Notice of Appeal.

The review is requested for the reasons stated below.

The Examiner rejected claims 1-3, 6, 8-13, 16, 18,20, 23-26 and 19-23 under 35 U.S.C. 103(a) as being unpatentable over Fukuda (U.S. Patent No. 6,549,667) in view of Brooks et al. (U.S. Patent No. 7,114,174).

As to claim 1, contrary to what is stated in the Final Office Action and Advisory Action, Fukuda fails to teach or suggest "identifying zero patterns across rows in the block of transform coefficients to derive zero pattern information, wherein identifying zero patterns comprises determining the location of zero values or near zero values for multiple rows in the block of transform coefficients" or "performing one dimensional inverse transforms on a subset of the total number of rows in the block of transform coefficients by using zero pattern information." Specifically, Fukuda teaches identifying <u>columns</u> having all zeros and placing this information in control flags, but does not identify <u>rows</u> having all zeros, nor does it use such an identification in

1

a one dimensional transform. Applicant notes that previous responses to the Examiner's arguments have highlighted the fact that Fukuda is lacking these elements, but that the Examiner repeatedly responds by pointing to a new section of Fukuda that, while mentioning the word "rows", does not in fact teach or suggest the identification of rows having all zeros. Applicant respectfully hopes that this appeal will settle the debate as to the relevance of Fukuda once and for all.

Referring to FIG. 14 and Col. 9, lines 7-57 in Fukuda, it can be seen that the invention in Fukuda steps loops through the columns and identifies whether each column contains only non-zero coefficients. It then places this information in control block A, as can be seen in FIG. 13A, with a "1" in an array position if the corresponding column has at least one non-zero coefficient, and a "0" in the array entry if the corresponding column has only zeros. Control block B is similar, except it contains a "1" in the array position if the last half of the corresponding column contains only zero coefficients, and a "0" in the array entry if the last half of the corresponding column contains at least one non-zero coefficient (See FIG. 13B).

An example of this is provided in FIGS. 15-16B and the corresponding text. Looking at, for example, the first array entry in control flag A as depicted in FIG. 16A, this entry contains a "1" because the first <u>column</u> of the coefficient block in FIG. 15 contains at least one non-zero coefficient. Likewise, the first array entry in control flag B as depicted in FIG. 16B contains a "0" because the last half of the first <u>column</u> of the coefficient block in FIG. 15 contains at least one non-zero coefficient.

In other words, Fukuda describes finding zero patterns in <u>columns</u> and processing the columns based upon these zero patterns. It does not describe finding zero patterns in rows and processing the rows based upon these zero patterns. As such, it fails to teach or suggest elements of claim 1, as previously amended.

In an interview, the Examiner pointed to Column 14, lines 55-59 of Fukuta as allegedly teaching that the transposition of columns and rows by Fukuta indicates that it teaches identifying zero pattern information across rows and also performing one-dimensional transforms across rows. Applicant respectfully disagrees. This section of Fukuta is describing the performance of a two-dimensional orthogonal transform (see Col. 14, lines 10-18). Ordinarily in two-dimensional orthogonal transforms, a first one-dimensional transform is performed on the columns, and the results placed in a matrix. Then a transposition operation is performed on the matrix to turn the resulting columns into rows and vice-versa. Then a second

2

one-dimensional transform is performed on the columns of this resulting matrix. Fukuta describes an invention wherein the step of transposing the resulting matrix is eliminated by combining the transposition step with the first one-dimensional orthogonal transform operation. ("For instance, the results of the first one-dimensional inverse transforms in the respective columns are outputted as the corresponding row elements of the transposed matrix" Col. 14, lines 33-35; "Hence it becomes possible to eliminate the process for transposing the result of the first one-dimensional inverse orthogonal transform in performing the second one-dimensional inverse orthogonal transform" Col. 14, lines 59-63.) Therefore, at no time does Fukuta teach performing one-dimensional transforms on rows of a matrix. Nor does Fukuta at any time teach performing a one-dimensional transform on rows using zero pattern information across rows.

Furthermore, in the Advisory Action of January 25, 2007, the Examiner argued that

Fig. 15 of Fukuda clearly shows the identification of the zeros patterns across the rows and columns. In addition to previously cited col. 10, lines 18-38 disclosing such identification, Fukuda further identify the zero patterns across rows in col. 24, lines 31-56; also the applicant should note that the steps performed on the columns are repeated across the rows even if Fukuda does not provide the details of the rows. In fact Fukuda never restricted the identification of the zero patterns to columns only.

Applicant respectfully disagrees. Fig. 15 in Fukuda merely depicts a matrix that includes, like all matrices, columns and rows. As described above, Fukuda only describes traversing this matrix to determine zero patterns across columns. The sample input matrix that is being examined is irrelevant - even if it did contain zero patterns across rows that would not mean that Fukuda teaches looking for these zero patterns. But nevertheless, Applicant notes that the matrix in FIG. 15 actually does not even contain zero patterns across rows, as column 1 contains all 1s and no 0s and thus all of the rows contain 1 in their first position. Nowhere does Fukuda teach a system that takes note of this fact, and taking note of this fact would be necessary if Fukuda were indeed looking for zero patterns across rows.

As to Column 24, lines 31-56, as with Col. 14, lines 55-59 described above, this section describes the performance of a two-dimensional orthogonal transform. This turns the columns in the result matrix into rows and vice-versa during a first one-dimensional orthogonal transform ("The write address generator 442 transforms the above described column addresses to the row addresses, such that the row numbers corresponding to the row addresses are the same as the column numbers corresponding to the column addresses," Col. 24,lines 63-67). The transposition is occurring on the resulting matrix, not on the input matrix. Nevertheless, there is still no disclosure of looking for or identifying zero patterns across rows of a matrix. All Fukuta

3

has done is swap the rows and columns in the result matrix, and does not use information about zero patterns across rows in this swap.

Independent claims 11, 24 and 34 contain elements similar to that as described above with respect to claim 1. As such, Applicant respectfully submits that these claims are in condition for allowance for the same reasons as described above with respect to claim 1.

Dependent claims 2-3, 6, 8-10, 12-13, 16, 18-20, 23, 25-26, 29-33 are also patentably distinct from the cited references for at least the same reasons as those recited above for the independent claim, upon which they ultimately depend. These dependent claims recite additional limitations that further distinguish these dependent claims from the cited references. For at least these reasons, claims 2-3, 6, 8-10, 12-13, 16, 18-20, 23, 25-26, 29-33 are not anticipated or made obvious by the prior art outlined in the Office Action.

The Examiner rejected claims 34-36 and 40-43 under 35 U.S.C. 103(a) as being unpatentable over Fukuda (U.S. Patent No. 6,549,667) in view of Brooks et al. (U.S. Patent No. 7,114,174).

Dependent claims 35-36 and 40-43 are also patentably distinct from the cited references for at least the same reasons as those recited above for the independent claim, upon which they ultimately depend. These dependent claims recite additional limitations that further distinguish these dependent claims from the cited references. For at least these reasons, claims 35-36 and 40-43 are not anticipated or made obvious by the prior art outlined in the Office Action.

The Examiner rejected claim 21 under 35 U.S.C. 103(a) as being unpatentable over Fukuda (U.S. Patent No. 6,549,667) in view of Brooks et al. (U.S. Patent No. 7,114,174) as applied to claim 11 above, and further in view of Lee (U.S. Patent No. 6,763,070).

Dependent claim 21 is also patentably distinct from the cited references for at least the same reasons as those recited above for the independent claim, upon which they ultimately depend. This dependent claim recites additional limitations that further distinguish this dependent claim from the cited references. For at least these reasons, claim 21 is not anticipated or made obvious by the prior art outlined in the Office Action.

Additionally, new claims 44-46 describe identifying zero pattern information across columns and performing a one-dimensional transform on such columns using the column zero pattern information. Thus, taking into account the respective independent claims, such

dependent claims now describe performing separate one-dimensional transforms on rows versus on columns, and using different zero pattern information in each. Therefore, even if Fukuta were found to teach identifying zero patterns across rows under some theory that rows and columns are interchangeable, it would still not teach these additional claims unless is described an embodiment where one-dimensional transforms are performed on <u>both</u> columns and rows using information about zero patterns in <u>both</u> columns and rows, which it does not.

Applicants believe that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Applicant also believes that this amendment places the claims in better condition for appeal. Therefore, even if the Examiner maintains the existing rejection, Applicant respectfully requests that the amendment be entered so that a timely appeal can be filed.

I am the attorney or agent acting under 37 CFR 1.34

Respectfully submitted,
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